DOCUMENT RESUME

ED 200 935 CS 006 028

AUTHOR Engel, Joanne B.
TITLE Cautiousness and Confidence as Factors in a Prose Learning Evaluation Task.
PUB DATE Apr 81
NOTE 57p.: Paper presented at the Annual Meeting of the American Educational Research Association (Los Angeles, CA, April 13-17, 1981).

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Adult Learning; Adults; Age Differences; *Knowledge Level; Multiple Choice Tests; *Performance Factors; Prior Learning; Psychological Characteristics; Reading Research; *Response Style (Tests); *Self Esteem
IDENTIFIERS *Cautiousness; *Prose Learning

ABSTRACT

Patterns of cautiousness in a prose learning task were examined in three age groups of adults representing three levels of educational experience. Types of instruction, order of material presentation, sex, and educational experience level were varied for all groups of the 90 adults participating in the study. The main findings were as follows: (1) there is no reason to assume that cautiousness adversely affects prose learning skills as one progresses through life; (2) levels of cautiousness are highly dependent upon the constraints established by the situation; (3) prior knowledge has the possiblity of making an adult learner more cautious, particularly if there is a similarity between past and present knowledge pools; and (4) middle-aged adults, whether they have continued their education or not, are as confident in approaching a difficult multiple choice prose learning task as are younger, scholastically experienced adults. (Author/RL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED200935

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Cautiousness and Confidence as Factors in a Prose Learning Evaluation Task

Joanne B. Engel, Ph.D.

Willamette University

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Joanne B. Engel

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CS006027P

Running head: Cautiousness and Confidence

Paper presented to Annual Meeting of American Educational Research Association, April 13-17, 1981, Los Angeles, California

Cautiousness and Confidence as Factors in a Prose Learning Evaluation Task

A considerable amount of research has evolved based on laboratory learning studies utilizing adults as samples. The primary areas for research of this nature are in the areas of cognition and memory (Howe, 1977; Arenberg & Robertson-Tchabo, 1978; Botwinick & Storandt, 1974; Arenberg, 1973; Anders, Fozard & Lillyquist, 1972). Relatively little research has been directed towards exploring specific behaviors adult learners bring into the classroom setting in general and into test taking situations in particular. One exception to this is the dissertation by Rindskopf (1976) in which rigidity and anxiety were explored for young, middle aged and older learners. The present study evolved in response to the need for research in what Hultsch and Pentz (Note 1) term a "contextual" learning setting.

It is a popular belief that attitudes, interests and values vary from generation to generation and that with age a more cautious approach to life prevails. In a review of adult age and cautiousness literature, Okun (1976; Note 2) commented that only the extremes of risk-taking behavior in adulthood are being explored. The bulk of the research studies restrict the samples to college undergraduates and elderly persons. Except for Tongberg (1970) and Rindskopf (1976) none of the literature reviewed by either Okun (1976; Note 2) or this author revealed studies relative to cautiousness which include middle aged adults. A focus of the present study was to follow up on the challenge issued by Kogan and Wallach (1964):

> There is a striking dearth of information about adults who are beyond college and not yet eligible for gerontological research. If we could collect systematic data on subjects in the 30 to 60 age range, we would obviously be able to specify a reasonably accurate age function for risk taking. The opportunity for advancing knowledge in this area is strong,

if one can bring a total life span perspective to the problem (p. 168).

One aspect in the learning behavior of older individuals which has recently received considerable attention is the role of cautiousness in decision-making situations (Taylor & Camp, Note 3; Okun, Siegler & George, 1978; Okun & Elias, 1977; Okun & DiVesta, 1976; Botwinick, 1966). Cautiousness has traditionally referred to the reluctance of a learner to risk being wrong for the sake of being correct (Korchin & Basowitz, 1957). It is a commonly held belief that older persons are more cautious than younger persons. This belief has received some empirical support utilizing elderly individuals as subjects. Older subjects seem unlikely to make a change or to venture a response that could result in gain if there is a risk of losing what is already in hand (Botwinick, 1973). He suggests that cautiousness increases with age because older subjects are disinclined to take any action. This means that older people tend to choose an alternative with no risk regardless of how high the probablility of success. An older person will opt for inaction given a ninety percent chance of success and a ten percent chance of failure if the option for inaction is available (Botwinick, 1966).

There is minimal evidence to suggest that the cautiousness trend can be found in groups composed exclusively of middle aged individuals (Stevens-Long, 1979). In a political poll, among subjects with only a high school education, middle aged subjects exceed the young in choosing the "no opinion" response. Education level was reported to be an important factor. The tendency for middle aged individuals to react in this manner may be due more to fear of failure than to the pattern of decline of self-confidence exhibited by the elderly. Hence it is possible different factors influence the responses of both the elderly and middle aged individuals relative to the concept of cautiousness.

Cautiousness in Meaningful Learning Tasks

It has been observed that elderly persons are more cautious than young. How does this cautiousness apply to test taking behavior or tasks of intellectual ability? The former question is one of the foci of this study. The second was investigated by Birkhill and Schaie (1975). Cautiousness was manipulated by systematically varying pre-test instruction conditions involving the reinforcement of two levels of risk and of response omission when taking the Primary Mental Abilities Test (PMA). The participants were given the choice of not responding (choice condition) or responding at all times (no choice condition). A Choice x Risk interaction was found. There was no difference in performance under the no-choice instruction but under the choice instruction subjects performed significantly better under low risk conditions. It was concluded that at least some older people do less well when they are afraid that involvement in a task involves unreasonable risk of loss or embarrassment, but control of instructional set may cause an elderly adult to consider alternatives which may otherwise be discarded.

Prose learning

The study of processes involved in prose memory learning tasks have been utilized to discover how elderly adults organize information under ordinary "everyday" conditions as opposed to laboratory conditions (Deese, 1961; Hulika, 1967; Gordon & Clark, 1974; Taub, 1976; Taub & Kline, 1978). The use of meaningful verbal material is particularly useful with older adults because it serves to maintain their motivational level to a greater extent than would lists of words or nonsense syllables (Hulicka, 1967). Use of prose materials also serves to extend the applicability of laboratory research to events encountered in everyday life. A series of three articles titled "Translations in Gerontology——From Lab to Life" recently appeared in the American Psychologist;

(Schonfield, 1974; Birren, 1974; Schaie, 1974) these articles argued that laboratory research is a potential friend of the aging adult and findings need to be utilized for the benefit of an aging population in practical sorts of ways.

Searching for prose learning research that utilized middle aged adults as subjects was a difficult task at best. A body of knowledge relative to prose recall learning by the elderly is growing rapidly (Taub & Kline, 1978; Bromley, 1958; Gordon & Clark, 1974; Taub, 1975). Only one prose learning study (Taub, 1976) was found which utilized young, middle aged adults as subjects. Females (ages 21-36) were the young group in a prose learning research design comparing young and elderly female learners. The prose selection was from Form B of the Rates of Reading subtest of the Diagnostic Reading tests. The task consisted of reading paragraphs aloud and silently then taking an 18 item comprehension test following reading trials. The silent reading condition was concluded to be the mode of choice for young and elderly subjects as it required less time with no loss in retention.

Application questions and prose learning

Education is designed to develop the critical thinking ability of students. Presenting questions is a common mode of assessment of this critical thought process. Watts and Anderson (1971) developed the application question hypothesis to determine if asking application questions during the learning process facilitated the learner's ability to apply concepts or principles in a post-test setting. The application question hypothesis derives support from studies which demonstrate a facilitative effect of application questions inserted close (adjunct) to the textual material (Watts & Anderson, 1971; Felker & Dapra, 1975; Woods & Andre, Note 4; 1978). In the typical adjunct question prose learning task, participants read prose passages and answer a

series of application, factual or both types of adjunct questions while reading. Post-tests are then completed which consist exclusively of new application questions. In a review of the literature Andre (Note 5) has suggested type of adjunct question is generally not a very powerful determinant of learning to apply concept materials presented in prose. In spite of this conclusion, it seems that a similar prose learning paradigm could be developed which, when integrated with the concepts of level of confidence and errors of omission can be utilized to investigate cautiousness patterns of adult students in a realistic applied test taking situation.

The relationship of cautiousness to learning for middle aged adults is a non-congnitive factor of learning which can be best understood from the contextual point of view. The concept of cautiousness can be explored through the use of a task commonly met by most adults as they improve their quality of life through personal advancement. The multiple choice test is one means utilized by industry (merit exams), the federal government (civil service examinations) licensing agencies (real estate, insurance companies), the professions (physicians, nurses, legal services) and institutes of post-secondary education in order to determine who will advance within the constraints of a chosen career. Examining errors of omission in a multiple choice test taking situation as a measure of cautiousness has been well-documented as a characteristic of elderly individuals. However, aging and learning research has not investigated patterns middle aged individuals exhibit relative to errors of omission in a test taking situation. Given the detrimental nature errors of omission can have during the prime career growth period of middle aged adults and the current interest in advanced education by adults it is surprising there has not been more attention given to exploring test taking skills and patterns of the middle aged adult.

The purpose of the present study was first, to document patterns of errors of omission for three categories of adults through the use of a prose learning task with controlled levels of instruction designed to affect test taking style. The second focus of this study involved an exploration of expressed levels of confidence by adults faced with making the best decision in a multiple choice test situation. The investigation explored the following hypotheses:

1. There is a positive relationship between level of educational experience and cautiousness: the middle aged adult in the scholastically naive group (group three) will be more cautious than both of the scholastically experienced adult groups.

2. There is a positive relationship between type of instruction and style of test taking: directions to guess (G) will decrease errors of omission and instructions not to guess (DG) will increase errors of omission for all three levels of subjects when compared to personal style (PS) of test taking.

3. There is a positive relationship between confidence levels for this task and educational experience: the two groups of scholastically experienced adult students will exhibit higher levels of confidence for all types of responses than will the scholastically naive adult students.

METHOD

Subjects

The sample consisted of 90 adults representing an age span from seventeen to fifty-five years of age and a range of post-secondary quarter hour academic credits from none to forty-five. Three equivalent groups were selected based on age and academic experience. Group one consisted of 30 volunteers (12 males, 18 females) who ranged from 17 to 20 years of age ($\bar{X}$ = 18.60, s.d. = 0.72) and represented a collection of academic quarter hours which ranged from 10 to 43 credits ($\bar{X}$ = 27.73, s.d. = 6.33). This group was labeled scholastically experienced young adults (SEY). Group two consisted of 30 participants (11 males, 19 females) who represented an age range of 24 to 46 years ($\bar{X}$ = 28.76, s.d. = 5.02) and represented an academic quarter hour range of 3 to 45 credits ($\bar{X}$ = 25.73, s.d. = 14.00). This group was labeled scholastically experienced adults (SEA). The third group of thirty adults (6 males, 24 females) ranged in age from 25 to 55 years ($\bar{X}$ = 38.46, s.d. = 9.97) and had no post-secondary education. This group was classified as scholastically naive adults (SNA).

Table 1

Characteristics of Sample

Characteristics	SEY	SEA	SNA
SEX			
Males	12	11	6
Females	18	19	24
AGE RANGE (years)	17-20	24-46	25-55
Males	18-20	24-39	28-47
Females	17-20	25-46	25-55
MEAN AGE (years)	18.80	28.76	38.46
STANDARD DEVIATION (years)	0.72	5.02	9.97
Male: Mean Age	18.66	28.09	34.16
Standard Deviation	0.65	4.72	8.56
Female: Mean Age	18.55	29.15	39.54
Standard Deviation	0.78	5.27	10.16
CREDIT RANGE (Quarter Hours)	10-43	3-45	0.00
Male	15-43	6-42	0.00
Female	10-39	3-45	0.00
MEAN CREDITS	27.73	25.73	0.00
STANDARD DEVIATION (credits)	6.33	14.00	0.00
Male: Mean Credit	27.08	27.54	0.00
Standard Deviation	6.68	10.79	0.00
Female: Mean Credit	28.16	24.68	0.00
Standard Deviation	6.25	15.75	0.00
MEAN VOCABULARY SCORES	17.20	17.49	17.01
STANDARD DEVIATION (vocabulary scores)	7.40	7.49	10.67
Male: Mean Vocabulary Score	19.05	18.26	20.01
Standard Deviation	4.67	7.61	9.39
Female: Mean Vocabulary Score	15.00	16.73	14.20
Standard Deviation	8.70	7.31	10.77
SIGNED UP FOR CREDIT	30	0	0
RECRUITED BY LETTER	0	30	7
GRATIS VOLUNTEERS FROM AD	0	0	1
PAID VOLUNTEERS FROM AD	0	0	22

Table 2

Order of Counterbalanced Conditions for Each Set of Directions
Personal Style (PS), Don't Guess (DG) and Guess (G)

Condition					
1	2	3	4	5	6
P	P	G	G	DG	DG
G	DG	P	DG	P	G
DG	G	DG	P	G	P

Table 3

Random Order of Passages by Concept and Topic

I. Learning Theory[a]
   - A. Intermittent Reinforcement
   - B. Generalization Gradients
   - C. Drive Reduction Theory
   - D. Classical Conditioning

II. Freudian Psychology
   - A. Neurotic Nucleus[b]
   - B. Extroversion-Introversion[c]
   - C. Displacement[c]
   - D. Projection[c]

III. Social Psychology[b]
   - A. Learned Helplessness
   - B. Risky Shift
   - C. Attribution Theory
   - D. Social Methods of Desensitization

[a]Watts and Anderson, p. 99, 100, 101, 102 herein.

[b]Engel, p. 110, 121, 122, 123, 124 herein.

[c]Andre, p. 111, 112, 113 herein.

Statistical Analysis

The original plan was to complete a five-way analysis of variance with the between subject factors of Group, Sex and Order and the within subject factors of Answer and Instructions. However, due to the lack of both sexes in all possible Sex by Order cell combinations, two separate analyses needed to be completed. Thus a Sex by Order interaction was impossible to obtain due to the nature of the sex distribution within the sample.

The first design was a 3 (Group) x 6 (Order) x 2 (Answer) x 3 (Instructions) balanced split-plot analysis of variance. There were three levels of Group (Scholastically Experienced Young Adults, Scholastically Experienced Adults, Scholastically Naive Adults), six levels of Order (all combinations of Guess, Don't Guess, Personal Style), two levels of Question Type (Answerable, Not Answerable) and three levels of Instructions (Don't Guess, Guess, Personal Style). Analyses were performed for each of six dependent variables. They were: 1) proportion of errors of omission to total errors in the vocabulary task (i.e., one measure of cautiousness); 2) age; 3) total academic credits obtained by participants; 4) proportion of errors of omission to total errors in the prose learning task (i.e., a second measure of cautiousness); 5) confidence level for all questions attempted; and, 6) confidence level for all questions including those omitted with a 0.00 confidence level assigned to those which were omitted by the respondent.

A second split-plot 3 x 2 x 2 x 3 unweighted means analysis of variance was completed. This analysis included three levels of Group (Scholastically Experienced Young Adults, Scholastically Experienced Adults, Scholastically Naive Adults), two levels of Sex (Male, Female) two levels of Question Type (Answerable, Not Answerable) and three levels of Instructions (Don't Guess,

Guess, Personal Style). Analyses were performed for each of the six dependent variables explored in the 3 x 6 x 2 x 3 split-plot analysis of variance. A significance level of $p < .05$ was used as a minimum acceptable value for significance throughout the study. The Balanova 5 procedure outlined in the SOUPAC program developed at the University of Illinois was used to compute the ANOVAs. Tukey's Honestly Significant Difference test was utilized to make all pairwise comparisons among means.

MEASURES

Prose Learning Task

Three paper-and-pencil instruments were given. The first was an extension of the prose learning task developed by Watts and Anderson (1971) and refined by Andre (1976; Woods & Andre, Note 4). Twelve passages were developed and a posttest consisting of sixteen multiple choice questions was inserted after each set of four passages. The multiple choice questions were directly related to the content of the set of passages immediately preceeding it. Each passage page utilized the same conceptual format in presenting the information.

An instruction page was inserted after each set of four passages. These pages requested that the respondent attack the questions in a manner which represented their own personal style (PS) of multiple choice test taking, required them to guess (G) if they were unsure of the answer, required them not to guess (DG) but to respond only if they were sure of the answer. Otherwise, for this last condition, they were to leave the question blank. These three conditions of personal style (PS), guess (G) and don't guess (DG) were counterbalanced across all three educational experience groups to form six distinct conditions. The passages were presented in the same order throughout all six conditions. Table 2 summarizes the grid indicating the order for directions and Table 3 contains an outline summarizing the passage order.

Sixteen application questions were developed for each set of four passages. Four multiple choice type questions were designed for each passage. Each question had four alternatives. Two of the questions could be answered from the reading and two of the questions from each passage page had no clear answer. This forced the participants into a "must guess" situation if they were to respond to the questions. Two forms of question sets were developed

in order to minimize bias which might have evolved from a consistent presentation of questions. Participants were randomly assigned a form within each condition for each group of adults (SEY, SEA, SNA).

Confidence Level Rating

A confidence estimation line was placed between every item on the post-test and participants indicated their level of confidence for each response they chose to answer by making an "X" on the line. The confidence levels were obtained by measuring the line and obtaining a number which was utilized as the numerator of a fraction whose denominator was the total length of the line. The resulting proportion was considered as the confidence level for that respondent.

Wide Range Vocabulary Test

At the conclusion of the prose learning task, subjects were given the written form of the Wide Range Vocabular Test (WRVT). Since participants reflected a variety of educational backgrounds and academic interest levels, this was utilized as a screening device in order to ascertain that the groups were comparable in terms of intellectual ability. The Wide Range Vocabulary Test was also scored for errors of omission.

PROCEDURE

Participants were tested in groups whenever it was feasible. The experimenter read aloud the directions on the cover sheet of the booklet. Subjects worked through the task at their own pace. Room proctors were present to assure that participants did not look back to the text pages while making a response. Color coded passage and question pages helped to make this task easier. Upon completion of the prose learning task, the timed WRVT was given with the proctor noting, in seconds, the starting and completion times for each participant.

RESULTS

Group by Order by Answer by Instruction Split-plot Analysis of Variance

A 3 (Group) x 6 (Order) x 2 (Answer) x 3 (Instruction) split-plot analysis of variance was used to analyze the data examining levels of cautiousness. The data for all significant main effects and interactions were reported. All effects not mentioned were non-significant.

There was a significant between groups effect for Age, $F(2,72) = 74.76$, $p < .001$ with the Scholastically Experienced Young Adults ($\bar{X} = 18.60$) representing the youngest group, the Scholastically Experienced Adults ($\bar{X} = 28.76$) representing the middle age group and the Scholastically Naive Adults ($\bar{X} = 38.46$) representing the oldest age group of the sample. A comparison of means indicated the three groups differed ($p < .01$) from each other.

As expected, the between groups factor of Credit Total was also significant, $F(2,72) = 97.50$, $p < .001$ with the Scholastically Experienced Young Adults ($\bar{X} = 27.73$) accumulating the most credits and the Scholastically Naive Adults ($\bar{X} = 0.00$) accumulating the least. The difference between these two group means was significant at $p < .001$. There was no significant difference between the credit totals of the Scholastically Experienced Young Adults ($\bar{X} = 27.73$) and the Scholastically Experienced Adults ($\bar{X} = 25.73$). There was a significant difference ($p < .01$) between the credit totals accumulated by the Scholastically Experienced Adults and the Scholastically Naive Adults.

Measures of cautiousness

Proportion of omitted responses on vocabulary task. There was a significant main effect for Group, $F(2,72) = 3.72$, $p < .03$. The older, Scholastically Naive Adults obtained significantly higher percentages of errors by omission of responses ($\bar{X} = 19.33$) than did the Scholastically Experienced Adults ($\bar{X} = 10.95$) or the Scholastically Experienced Young Adults ($\bar{X} = 3.48$). The analysis of variance summary table for this dependent variable is presented in Table 5.

Total proportion omitted on prose learning task. There was a significant effect for Instructions, $F(2,144) = 76.65$, $p < .001$ and a significant Group by Order by Instructions interaction, $F(20, 144) = 1.62$, $p < .05$ for total proportion of omitted responses on the prose learning task. For this second measure of cautiousness there was no significant main effect for Group. A significantly ($p < .01$) higher percentage of errors of omission occurred in the Don't Guess instruction condition ($\bar{X} = 26.32$) than in the Personal Style ($\bar{X} = 6.62$) or Guess ($\bar{X} = 1.39$) instruction condition. The analysis of variance summary table for this dependent variable is presented in Table 6. The means for the three way interaction of Group by Order by Instruction are summarized in Table 7.

An additional analysis was completed in order to explore in more depth the effect of the first instructional set (either Don't Guess, Guess or Personal Style) upon proportion of omitted responses in the prose learning task. The 2 (Group) by 2 (Answer) by 3 (Instructions) split-plot analysis of variance revealed a significant main effect for Instructions, $F(2,80) = 30.50$, $p < .001$. There were significantly

Table 5

Analysis of Variance Summary Table for Proportion of Omitted Responses on Vocabulary Test

Source	d.f.	SS	MS	F	Prob.
Group	2,72	2.26	1.13	3.72	.02*
Order	5,72	1.73	.34	1.14	.34
Group x Order	10,72	2.16	.21	.71	.70
Subject/Group x Order		2.18	.30		

* $p < .05$.

Table 6

Analysis of Variance Summary Table for Proportion Omitted on Prose Learning Task for Type of Instruction and Interaction of Group, Order and Instruction

Source	d.f.	SS	MS	F	Prob.
Instruction	2,144	6.22	3.11	76.65	.001***
Group x Instruction	4,144	.17	.04	1.06	.376
Order x Instruction	10,144	.16	.01	.41	.936
Group x Order x Instruction	20,144	1.32	.06	1.62	.050*
Subjects x Instruction/ Group x Order		5.84	.04		

*** $p < .001$.
** $p < .01$.
* $p < .05$.

Table 7

Mean Percentage Errors of Omission on Prose Learning Task as a Function of Group, Order and Instructions

Scholastically Experienced Young Adults

Instruction	Order 1	2	3	4	5	6
Don't Guess	32.92[a]	21.17	15.54	30.00	87.50	34.60
Guess	0.00	5.24	0.00	0.00	0.00	0.00
Personal Style	11.65	1.25	0.00	6.49	13.32	19.07

Scholastically Experienced Adults

Instruction	Order 1	2	3	4	5	6
Don't Guess	23.13	13.99	16.06	14.57	41.88	14.00
Guess	0.00	1.25	2.50	0.00	8.99	7.07
Personal Style	1.25	2.50	0.00	0.00	19.92	13.24

Scholastically Naive Adults

Instruction	Order 1	2	3	4	5	6
Don't Guess	26.67	8.75	36.17	29.57	39.24	36.65
Guess	0.00	0.00	0.00	0.00	0.00	0.00
Personal Style	3.75	1.42	7.50	5.42	7.50	5.00

[a] Results are presented in percentages.

higher percentages of errors of omission occurring in the Don't Guess ($\bar{X}$ = 29.19) instructional set than in the Personal Style ($\bar{X}$ = 3.88) or Guess ($\bar{X}$ = 0.41) instructional sets. All means differed significantly at $p < .01$. Table 8 presents the ANOVA summary table for this factor.

Rated confidence level for all attempted questions

Two separate analyses for confidence level were completed. The first analysis examined confidence levels for all questions attempted by the respondents. The second analysis examined confidence levels for all questions with a 0.00 confidence value assigned to questions respondents chose to omit. Data for rated confidence levels for all attempted questions are included within the main portion of the Results section. Data for rated confidence levels with the assigned 0.00 value for all omitted responses are contained in Appendix N.

The means for the rated confidence levels were obtained from a scale ranging from one to ninety-nine on which participants indicated the degree of confidence they felt that the response they checked was correct. One indicated little confidence and ninety-nine indicated a high level of confidence. There was a significant effect for answer, $F(1,72) = 14.72$, $p < .001$ with rated confidence being higher for Answerable ($\bar{X}$ = 63.3) than Not Answerable ($\bar{X}$ = 60.1) questions.

There was also a significant Group by Answer interaction $F(2,72) = 5.69$, $p < .005$. The Answerable and Not Answerable means differed significantly ($p < .01$) for the Scholastically Experienced Young Adults ($\bar{X}$ Answerable = 62.0, $\bar{X}$ Not Answerable = 57.2)

Table 8

Analysis of Variance Summary Table for Proportion of Omitted Responses on Prose Learning Task from the 3 (Group) x 2 (Answer) x 3 (Instruction) Sub-analysis

Source	d.f.	SS	MS	F	Prob.
Group	2,80	.05	.02	.52	.591
Instruction	2,80	2.92	1.46	30.50	.001***
Group x Instruction	4,80	.24	.06	1.30	.276
Subjects/Group x Instruction		3.83	.04		

*** $p < .001$.

and the Scholastically Experienced Adult ($\bar{X}$ Answerable = 69.9, $\bar{X}$ Not Answerable = 64.4). The means for the Scholastically Naive Adult did not differ in the Answerable and Non-answerable condition ($\bar{X}$ Answerable = 57.9, $\bar{X}$ Not Answerable = 58.6).

There was a significant effect for type of Instructions, $F(2,72) = 15.69$, $p < .001$ for rated confidence levels for questions respondents chose to answer. There were significant differences ($p < .01$) in rated confidence levels between the Don't Guess ($\bar{X} = 66.7$) instruction set when compared to the Guess ($\bar{X} = 58.7$) and Personal Style ($\bar{X} = 59.6$) instruction conditions. The difference in rated confidence level between the Guess and Personal Style instruction sets was not significant.

The Order by Instruction interaction was also significant $F(10,144) = 2.58$, $p < .006$. See Table 9 for a summary of the confidence level means for this interaction. There was a significant difference ($p < .01$) between all means in the Don't Guess and Personal Style instructions as well as between the Don't Guess and Guess instructions for all categories of order. Means were also significant ($p < .01$) between Guess and Personal Style instructions for all but Orders one (P, G, DG) and three (G, P, DG).

The three way interaction of Order by Answer by Instruction was also significant $F(10,144) = 3.35$, $p < .001$. Table 10 summarizes the mean confidence levels for the combination of conditions. Table 11 contains the analysis of variance table for rated confidence levels.

Table 9

Means for Order by Instruction Interaction for Confidence Level for All Attempted on Prose Learning Task

Instruction	Order					
	1	2	3	4	5	6
Don't Guess	61.8	72.3	66.9	65.4	63.0	70.6
Guess	60.8	59.4	65.0	50.8	51.9	64.1
Personal Style	61.7	61.9	65.5	51.5	61.6	55.6

Table 10

Means for Order x Answer x Instruction Interaction for Confidence Level for All Attempted on Prose Learning Task

ANSWERABLE

Instruction	Order					
	1	2	3	4	5	6
Don't Guess	62.4	69.5	69.6	63.8	68.3	75.2
Guess	63.6	60.7	69.4	55.0	57.2	64.1
Personal Style	64.9	62.8	65.7	52.7	61.3	56.9

NOT ANSWERABLE

Instruction	Order					
	1	2	3	4	5	6
Don't Guess	61.2	75.1	64.3	67.0	57.8	66.0
Guess	57.9	58.1	60.6	46.6	51.1	64.2
Personal Style	58.5	60.9	65.3	50.2	62.0	54.3

Table 11

Analysis of Variance Summary Table for Rated Confidence Level for All Attempted Questions on Prose Learning Task: 3(Group) x 6 (Order) x 2 (Answer) x 3 (Instruction) Analysis

Source	d.f.	SS	MS	F	Prob.
Answer	1,72	138698.0	183688.3	14.72	.001**
Grp. x Ans.	2,72	107225.0	53612.5	5.69	.005*
Order x Ans.	5,72	40696.9	8139.3	0.86	.509
Grp. x Order x Ans.	10.72	92764.5	9276.4	0.98	.464
Sub. x Ans./ Grp. x Order		678043.0	9417.2		
Instr.	2,144	687372.4	343686.2	15.61	.001**
Grp. x Instr.	4,144	51060.6	12765.1	0.58	.677
Order x Instr.	10,144	5698613.7	56968.1	2.58	.006*
Grp. x Order x Instr.	20,144	285549.3	14277.4	0.64	.869
Sub. x Instr./ Grp. x Order		3168945.2	22006.5		
Ans. x Instr.	2,144	12883.8	6441.9	1.10	.334
Grp. x Ans. x Instr.	4,144	18784.6	4696.1	0.80	.524
Order x Ans. x Instr.	10,144	195696.0	19569.6	3.35	.006*
Grp. x Order x Ans. x Instr.	20,144	77204.7	38602.3	0.66	.858
Sub. x Ans.x Instr./ Grp. x Order		840853.7	5839.2		

*** $p < .001$.

** $p < .01$.

* $p < .05$.

In order to further explore the effects of order on instruction for rating confidence levels, a separate 3 (Group) by 2 (Answer) by 3 (Instructions) analysis was completed for the first type of instruction encountered by the respondents. There was a significant Group by Instruction interaction, $F(4,80) = 3.03$, $p < .02$. When Don't Guess was the first instruction set, the Scholastically Naive Adults expressed higher ($p < .01$) levels of confidence in their responses than did the Scholastically Experienced Young Adults ($\bar{X}$ SNA = 72.5, $\bar{X}$ SYA = 64.1). When Personal Style was the initial instruction set, the reverse was true. In this instance both scholastically experienced adult groups ($\bar{X}$ SEY = 70.3, $\bar{X}$ SEA = 72.3) expressed significantly ($p < .01$) higher levels of confidence in their responses than did the Scholastically Naive Adults ($\bar{X}$ = 46.3).

There was also a main effect for Answer in this analysis with higher confidence ratings given to Answerable ($\bar{X}$ = 66.8) than Not Answerable ($\bar{X}$ = 57.9) questions. The analysis of variance summary table for rated confidence level in this 3 x 2 x 3 analysis of variance for rated confidence levels is found in Table 12.

Group by Sex by Answer by Instruction Split-plot Analysis of Variance

Measures of cautiousness

A 3 (Group) x 2 (Sex) x 2 (Answer) x 3 (Instructions) split-plot analysis of variance was used to analyze the data examining levels of cautiousness. As in the first analysis, there were significant group effects for age, $F(2,84) = 49.21$, $p < .001$ and credit total, $F(2,84) =$

Table 12

Analysis of Variance Summary Table for Rated Confidence Levels for All Attempted Questions in the 3 (Group) x 2 (Answer) x 3 (Instruction) Analysis

Source	d.f.	SS	MS	F	Prob.
Group	2,80	259089.7	129544.9	1.80	.171
Instruction	2,80	236447.6	118,223.8	1.64	.199
Group x Instruction	4,80	872715.7	218,178.9	3.03	.022*
Subjects/ Group x Instruction		5749306.2	71,866.3		
Answer	1,80	261165.0	261,165.0	27.64	.001**
Group x Answer	2,80	51283.8	25,641.9	2.71	.072
Answer x Instruction	2,80	23762.9	11,881.4	1.25	.289
Group x Answer x Instruction	4,80	27066.2	6,766.5	0.71	.583
Subjects x Answer/ Group x Instruction		755859.5	9,448.2		

*** $p < .001$.

** $p < .01$.

* $p < .05$.

72.96, $p < .001$. The Tukey Honestly Significant Difference test indicated significant differences ($p < .01$) among all combinations of groups. The scholastically experienced young adults were the youngest ($\bar{X}$ = 18.61) and had acquired the most credits ($\bar{X}$ 27.62). The Scholastically Experienced Adults were the next oldest ($\bar{X}$ = 28.62) and had accumulated 26.11 credits. The eldest group ($\bar{X}$ = 36.83) represented by the Scholastically Naive participants, had accumulated no post-secondary credits.

Total proportion omitted on prose learning task. For the second measure of cautiousness, total proportion of errors of omission on the prose learning task, there was only one significant effect. This was for instruction, $F(2,168) = 57.39$, $p < .001$ with the highest percentage of omission occurring in the Don't Guess instructions condition ($\bar{X}$ = 25.67) and the least percentage of omission in the Guess condition ($\bar{X}$ = 1.37). The Personal Style condition was between the other two scores with a mean of 6.38% errors of omission. All means differed at $p < .01$. Table 13 reflects the ANOVA summary table for this factor.

Rated confidence level for all attempted questions

Four combinations of four factors achieved significance for the dependent variable which reflected rated confidence level for those questions attempted by the participants. There were main effects for both Answer, $F(1,84) = 12.85$, $p < .001$ and Instructions, $F(2,168) = 10.57$, $p < .001$ conditions. Higher confidence levels were assigned to the questions which were Answerable ($\bar{X}$ = 63.9) than for those questions which were Not Answerable ($\bar{X}$ = 60.5). In the instruction sets , higher confidence

Table 13

Analysis of Variance Summary Table for Total Proportion Omitted Responses on the Prose Learning Task: 3 (Group) x 2 (Sex) x 2 (Answer) x 3 (Instruction) Analysis

Source	d.f.	SS	MS	F	Prob.
Instruction	2,168	4.82	2.41	57.39	.001**
Group x Instruction	4,168	0.09	0.24	0.57	.682
Sex x Instruction	2,168	0.26	0.13	0.31	.731
Group x Sex x Instruction	4,168	0.20	0.51	1.22	.304
Subject x Instruction/ Group x Sex		7.06	0.42		

*** $p < .001$.

ratings were expressed for questions in the Don't Guess condition ($\bar{X}$ = 67.0) than in the Personal Style ($\bar{X}$ = 60.2) or Guess ($\bar{X}$ = 59.5) conditions. The difference between the Don't Guess and Guess instructions was significant at $p < .01$. The means in the Don't Guess and Personal Style categories differed at $p < .05$. There were no differences in ratings of confidence level between the Guess and Personal Style conditions.

There was a Group by Answer interaction that was significant $F(2,84) = 3.88$, $p < .05$. In this instance the rated confidence level means in the Answerable and Non-answerable conditions differed significantly for both the Scholastically Experienced Young Adults ($\bar{X}$ Answerable = 62.8, $\bar{X}$ Not Answerable = 57.9) and Scholastically Experienced Adults ($\bar{X}$ Answerable = 70.6, $\bar{X}$ Not Answerable = 65.1). The rated confidence level means for the Scholastically Naive Adults did not differ for the two levels of answer style ($\bar{X}$ Answerable = 58.2, $\bar{X}$ Not Answerable = 58.6).

There was also a complicated four way interaction in this confidence level rating analysis which was represented by a Group by Sex by Answer by Instruction interaction, $F(4,168) = 3.06$, $p < .05$. The means for this interaction are summarized in Table 14. The analysis of variance summary table for this analysis is found in Table 15.

Table 14

Means for Group x Sex x Answer x Instruction Interaction for Confidence Level for All Attempted on Prose Learning Task

Scholastically Experienced Young Adults						
	Answerable			Not Answerable		
	Don't Guess	Guess	Personal Style	Don't Guess	Guess	Personal Style
Male	67.4	67.5	64.7	67.3	57.3	60.4
Female	65.8	52.6	58.7	57.6	51.2	53.6

Scholastically Experienced Adults						
	Answerable			Not Answerable		
	Don't Guess	Guess	Personal Style	Don't Guess	Guess	Personal Style
Male	77.3	72.3	70.4	66.7	66.9	70.3
Female	71.7	67.7	63.8	69.1	57.5	60.1

Scholastically Naive Adults						
	Answerable			Not Answerable		
	Don't Guess	Guess	Personal Style	Don't Guess	Guess	Personal Style
Male	63.3	58.4	54.6	66.6	53.7	55.0
Female	64.1	53.9	54.9	65.8	54.8	55.5

Table 15

Analysis of Variance Summary Table for Confidence Level for All Attempted Questions on Prose Learning Task: 3 (Group) x 2 (Sex) x 2 (Answer) x 3 (Instruction) Analysis

Source	d.f.	SS	MS	F	Prob.
Ans.	1,84	123933.6	123933.6	12.85	.005**
Grp. x Ans.	2,84	74912.9	37456.4	3.88	.024*
Sex x Ans.	1,84	698.2	698.2	0.07	.788
Grp. x Sex x Ans.	2,84	1361.1	680.5	0.07	.931
Sub. x Ans./ Grp x Sex		809884.6	9641.4		
Instr.	2,168	500093.7	250046.8	10.57	.001***
Grp. x Instr.	4,168	47616.2	11904.0	0.50	.733
Sex x Instr.	2,168	26627.8	13313.9	0.56	.570
Grp. x Sex x Instr.	4,168	20539.5	5134.8	0.21	.928
Sub. x Instr./ Grp. x Sex		970976.4	23635.6		
Ans. x Instr.	2,168	19345.1	9672.5	1.59	.205
Grp. x Ans. x Instr.	4,168	18597.6	4649.4	0.76	.548
Sex x Ans. x Instr.	2,168	10464.3	5232.1	0.86	.423
Grp. x Sex x Ans. x Instr.	4,168	74276.5	18569.1	3.06	.018*
Sub. x Ans./ Grp. x Sex					

*** $p < .001$.

** $p < .01$.

* $p < .05$.

DISCUSSION

Specific subject selection and task administration procedures may have served to limit the generalizability of the results of this study. In order to form the sample group of scholastically experienced adults, letters were sent to all adult students in attendance at one mid-western university who had accumulated forty-five or less academic credits. Fewer than one-third of those contacted volunteered to participate in the project. Informal discussion after the task indicated the motivation for participation varied. Some did receive point credit towards their psychology classes; others wished to participate in order to learn more about themselves in a test-taking situation and some wished to see what a pyschology learning experiment was like. None of the participants in this group were paid for participation. A sample bias related to this group of scholastically experienced adults could emerge in several ways.

First, the participants were different from the general population of adults in that they had already chosen to obtain post-secondary training with a baccalaureate degree as a final long-range objective. Second, they agreed to participate in the study while the majority of their cohorts did not choose to do so. Third, the females outnumbered the males almost two to one for this particular sample sub-group.

Subject selection was also viewed as a particularly difficult problem during formation of the scholastically naive adult sub-group. In this instance the sample was obtained by newspaper ads and letters (some of which were followed by phone calls). In addition, some

participants brought a friend who also agreed to participate. In this sample, some respondents volunteered to participate gratis but the majority were paid a modest sum in order to defray expenses for travel or child care. Whether the motivations for participation varied according to recruitment status is unknown as is the effect on results. The female participants outnumbered the males four to one in this sub-sample thus further limiting the generalizability of the conclusions.

Testing procedures also may have a confounding effect upon results. Initially, specific group testing situations were established in order to collect the data. This was an acceptable procedure in acquiring information from the scholastically experienced young adult sample. Their accessibility to campus and desire for grade credit were conducive to group data collection methods. However, the environmental demands upon the older, scholastically experienced adults made group data collection difficult. Individual appointments were necessary in order to acquire sample information. The bulk of the data for the scholastically naive sample, however, was obtained in two group sessions with ten to fifteen participants per session. A small minority of this sub-sample experienced individual testing sessions. Any effects resulting from group versus individual data collection procedures were not assessed in this study.

A final and more serious sample weakness was the unexpected confounding age variation between the two older adult groups. There was a significant ($p < .01$) age difference between the scholastically experienced adults ($\bar{X} = 28.76$) and the scholastically naive adults

($\bar{X}$= 38.46). It was anticipated this would not be the case. Thus age is a confounding variable in this study and cannot be eliminated from consideration in interpreting the results.

In the future, it may be possible to eliminate these sample problems through contact with a more accessible pool of adults. Industry, government offices or junior and four year college systems that utilize prose learning or multiple choice tests may be willing to share the accumulated results in an anonymous fashion. This would permit a spread of age, sex, ability and educational levels and a relatively consistent data collection environment. The motivation factor would also be similar thus making it easier to assume homogeneity of anxiety level.

The hypothesis that older, scholastically naive adults would reflect higher levels of cautiousness in an applied risk taking situation such as a prose learning multiple choice task was only partially substantiated. There were no differences relative to errors of omission on the prose learning task among any of the three age groups regardless of level of educational experience. The older, middle aged, scholastically naive adults reflected omission patterns similar to those exhibited by the scholastically experienced young adults and scholastically experienced adults.

Group differences relative to errors of omission did emerge on the Wide Range Vocabulary Test given at the conclusion of the prose learning task. In this instance the scores of the older, less scholastically experienced adults reflected a significantly higher

proportion of errors of omission than those obtained by either of the two groups. In addition, the scholastically experienced adults made more errors of omission on the vocabulary task than the scholastically experienced young adults in spite of the fact their credit totals (i.e. educational experience) were not significantly different. No sex differences were evident relative to errors of omission on either the prose learning task or the vocabulary task.

If the task as presented in this study is viewed as a type of risk taking situation, then the results present evidence which is both supportive and contradictory relative to conclusions found in previous studies by Korchin and Basowitz (1957) and Botwinick (1973). Although the present task was not a replication of the Korchin and Basowitz (1957) study in which it was found that older learners were reluctant to risk being wrong for the sake of being correct, the present study found no consistent evidence that was true for middle-aged learners. Adults did choose alternatives rather than omitting them thus extending Botwinick's (1973) study in which he suggested that with increasing age elderly subjects are disinclined to take any action which could result in gain if there is a risk of losing what is already in hand. The present research found this to be true only in the vocabulary portion of the task but not in the prose learning task.

Since there were no differences in scores on the Wide Range Vocabulary Test it was possible to partially confirm the conclusion by Edwards and Wine (1963) that when intelligence levels were matched for men of differing ages, cautiousness was no longer seen as age related.

This was true for the prose learning portion of the task in which the three groups, matched by vocabulary test scores, did not exhibit differences relative to levels of cautiousness. Why this was not true on the vocabulary task leads to some additional hypotheses related to the choice of task and cautiousness in adults.

The two tasks differed in two important respects. First, the vocabulary task required prior knowledge in order to obtain a satisfactory score. Second, the gradually accelerating level of difficulty of words was unique to the vocabulary portion of the task. Neither of these conditions was present in the prose learning task. The prose learning task was designed to depend less on prior knowledge and more on ability to read a series of prose passages with no time restrictions and to respond immediately to a series of applied questions designed to be related to the readings. The task was also designed to reflect a consistent reading level equivalent to that found in introductory college textbooks.

This observation leads to another intriguing question. It may be possible that cautiousness is reflected more in tasks or situations in which adults have prior knowledge and experience. If this is the case, then the life experiences of adults would lead them to be more cautious in responses. It is the authors observation that the more knowledge a student brings into a introductory class setting, the more difficult it is for that student to answer a question requiring an elementary answer while a less well-read student finds it easier to respond. For instance, graduate students often comment they have

difficulty answering introductory level college examination questions in their major field of study.

Perhaps too, the difference relative to errors of omission on the vocabulary and prose learning task may be related to the fact that the adults took the prose learning test immediately after learning the material. The length of time between learning and recall was variable for the vocabulary task. Checking whether length of time between learning and recall may affect level of cautiousness for various categories of learners would be a fruitful avenue for extended research. It is hypothesized that the prose learning task is more similar to a classroom situation and results of this nature would have more applicability for educators of adults.

Other interesting hypotheses may be generated relative to the difference in levels of cautiousness observed from responses to the two tasks. Perhaps middle-aged adults have not reached the stage where, as Botwinick (1973) observed, society in general tends to react with condemnation, rejection and expectations of failure. Thus they have not yet learned to "inhibit response, value accuracy, make the omission error" (p. 103). This does not help us understand, however, why the older, less scholastically experienced adults produced higher errors of omission on the vocabulary task than on the prose learning task. Perhaps there is already an expectation of failure built into a vocabulary task while no such expectations existed for the prose learning task.

Botwinick's (1969) conclusion that older people would choose to avoid risk taking if that option were available was not substantiated by the results of this study for this sample of middle-aged individuals. The "Don't Guess" direction set was designed to provide an opportunity for all respondents to omit responses. The level of omission for this direction set was significantly greater than for the other two direction sets. However, no age or experience level differences in errors of omission were found indicating levels of cautiousness remained equivalent for all categories of subjects.

In attempting to explore further the different results for the vocabulary versus the prose learning task, it is necessary to consider the possibility that responses on the vocabulary task were more reflective of a typical response pattern than those acquired during the prose learning task. Comments by participants during the debriefing sessions indicated anxiety was high during the prose learning task since the cover sheet indicated the task held some predictive value for future academic endeavors. Observation suggested a more relaxed, less tense appearance on the part of the respondents as they began the vocabulary task after spending from forty to ninety minutes on the prose learning task. It could also be assumed that a forty-eight item vocabulary task was a familiar and less mentally taxing experience for the participants. Given the high level of difficulty of the vocabulary task and possibly remembering school-day admonitions to "skip those you don't know" the older, scholastically naive adults proceeded to commit more errors of omission for this task than did the scholastically experienced

adults or the scholastically experienced young adults.

There could also be a cohort related learning skills effect hidden within this result pattern. The younger adults, with more experience in a multiple choice style test, may have been under more consistent subtle influence to take advantage of probability in a multiple choice task and, regardless of the direction set, to guess even when they were instructed not to guess. In general, older adults made comments pertinent to the point that multiple choice tests were a new learning challenge. The scholastically experienced adults stated that becoming used to a multiple choice testing situation was as much of a challenge as reading the text and coping with the classes. Some of the scholastically naive adults commented they had never taken a multiple choice test in school or that it had been years since they had experienced a task similar to either the vocabulary or prose learning task.

Other contributing factors to the lack of errors of omission on the prose learning task were the multiple influences of order and instruction. No interactions of this nature complicated the vocabulary task as levels of order and instruction were not inherent within the design. However, there was a consistent effect for type of instruction on the prose learning task. As hypothesized, instructions to guess decreased errors of omission and instructions not to guess increased errors of omission when compared to the personal style condition of test taking. Thus the second hypothesis was confirmed. In addition, the instructional admonition to "don't guess" as the first of two instructional sets (Orders Five and Six) produced higher error of

omission scores than any other order for all three instructional direction statements. Thus encouraging omissions by exclusion of the guess option could have established a response set encouraging higher levels of errors of omission in both the Personal Style and Guess conditions.

The third hypothesis, that the Scholastically Experienced Adult students would exhibit higher levels of confidence for all types of responses, was not substantiated. Two categories of rated confidence level estimation were developed from the data to explore this hypothesis. One set of confidence level means evolved from analyzing data only from questions respondents actually attempted. Since these may have reflected higher confidence levels for the individual who simultaneously made more errors of omission, confidence level data were also analyzed after assigning a value of 0.00 as a confidence level score for all omitted questions. In neither analysis was there a main effect for Group, Order or Sex. Consequently the major factors affecting confidence levels in both analyses were whether a question was Answerable or Not Answerable, and whether the instructions dictated that the respondent should guess, not guess or respond in the manner of his or her choice. Confidence levels were consistently higher for answerable questions. Confidence levels excluding questions respondents omitted were highest for questions with the Don't Guess instruction and lowest for the Guess instruction. The pattern was reversed for confidence levels where 0.00 was assigned to those participants chose to omit. In this instance, confidence scores were highest for the Guess instruction set and lowest

for the Don't Guess instruction set.

Group entered as a factor in a group-by-answer interaction but only in the analysis in which questions respondents chose to answer were analyzed. In this situation, the scholastically experienced adults exhibited higher levels of confidence for both answerable and not answerable questions than the other two groups of adults. The younger adults, however, were more confident in the answerable mode while the older, scholastically naive adults expressed higher confidence levels for unanswerable questions.

Several aspects of this research project warrant further investigation. First, it would be useful to explore whether errors of omission occur in various other applied situations where the risks are more real than those contrived by a prose learning multiple choice task. An example of such situations could be scores from drivers' examinations obtained from the Department of Transportation Driver Licensing Bureau. State licensing agencies or merit boards may be interested in exploring the types of errors exhibited by individuals of differing age, educational and professional levels for the purpose of determining how much test taking skills contribute to an individuals final score. It may be possible that test taking skills may produce low scores for an otherwise capable individual up for promotion and that the low scores on the test would deny the individual the promotion. This would indicate that perhaps formulas utilized by industry and government may need to be re-weighted in terms of the values assigned to a multiple choice test. Entrance examinations for guidance of adults returning to

school could also be examined to determine if errors of omission could produce detrimental test scores as these adults face their first set of post-secondary examinations.

Second, investigation of the variance in results between the prose learning task and vocabulary task in terms of prior versus immediate knowledge as well as the effect of time between learning and recall and their respective relationships to cautiousness would contribute to the understanding of cautiousness across the lifespan. For this variable of cautiousness in particular, ontogenetic, age-graded sources of influence appear to be less important than non-age related sources of influence such as historical changes in educational patterns. This project in particular provided support for a comment by Hultsch and Pentz (Note 1) that "the more we emphasize meaning rather than accuracy and the role of broader contexts in learning and memory, the more significant evolutionary history-graded and non-normative influences will become" (p. 26).

Third, more care in sampling techniques and the use of data acquired from a realistic rather than contrived learning task may also produce a more realistic assessment of the extent to which cautiousness affects the everyday decision making ability of adults.

Fourth, some general implications suggest themselves for use by persons working with older learners. For instance, permitting adults to share new learnings and to openly integrate them with experiences would encourage even the most cautious to risk speaking in class. Designing examinations which would assess only recent prose learning would appear

to decrease errors of omission. Adult educators need to realize that adults re-entering educational training programs are very confident in themselves when they choose to tackle a problem. This study leads one to also hypothesize that in situations in which the learner is given no choice, then the adult learner in particular would retreat into a more cautious mode of operation.

In general, it can be concluded that adults do not appear to be disadvantaged when presented with a learning task which requires reading and assimilation of content followed by a multiple choice test. However, there are also indications that prior knowledge has the possibility of making the learner more cautious if there is a degree of similarity between the past and present knowledge pools. Second, at this point there is no reason to assume cautiousness increases as one progresses through life. Levels of cautiousness are highly dependent upon the constraints established by the task thus making generalized statements about cautiousness and adults tenuous. Finally, middle-aged adults, whether they have continued with their education or not, are as confident in approaching a difficult multiple choice prose learning task as are the younger, scholastically experienced adults.

REFERENCE NOTES

1. Hultsch, D. F. & Pentz, C. A. Research on adult learning and memory: retrospect and prospect. Manuscript submitted for publication, 1979.

2. Okun, M. A. Adult age and cognitive performance: The role of noncognitive factors. Manuscript submitted for publication, 1979.

3. Taylor, D. W. & Camp, C. J. Cautiousness as a covariate: Issues in the application of signal detection theory to aging research. Paper presented at the 31st meeting of the Gerontological Society, Dallas, November 1978.

4. Woods, A. & Andre, T. Level of adjunct question, type of feedback and learning concepts from prose. Paper presented at the meeting of the American Educational Research Association, Toronto, March 1978.

5. Andre, T., Mueller, C., Womack, S., & Smid, K. Adjunct application questions facilitate later application, or do they? Manuscript submitted for publication, 1979.

REFERENCES

Anders, R. R., Fozard, J. L., & Lillyquist, T. D. The effects of age retrieval from short term memory. Developmental Psychology, 1972, 6, 214-217.

Anderson. R. C., Spiro, R. J. & Montague, W. E. Schooling and the acquisition of knowledge. Hillsdale, N. J.: Lawrence Erlbaum, 1977.

Andre, T. Learning concepts from prose. Final report on Grant 406-21-01. Ames, Iowa: Iowa State University, 1976.

Andre, T. & Sola, J. Imagery, verbatim and paraphrased questions and retention of meaningful sentences. Journal of Educational Psychology, 1976, 68, 661-669.

Andre, T. & Womack, S. Verbatim and paraphrased adjunct questions and learning from prose. Journal of Educational Psychology, 1978, 70, 796-802.

Arenberg, D. Cognition and aging: Verbal learning, memory, problem solving and aging. In C. Eisendorfer and M. P. Lawton (Eds.), The psychology of adult development and aging. Washington, D. C.: American Psychological Association, 1973.

Arenberg, D. & Robertson-Tchabo, E. Learning and aging. In J. E. Birren and K. W. Schaie (Eds.), Handbook of the psychology of aging. New York: Van Nostrand Reinhold Company, 1978.

Baltes, P. B., & Nesselroade, J. R. The developmental analysis of individual differences on multiple measures. In J. R. Nesselroade and H. W. Reese (Eds.), Life-span developmental psychology: Methodological issues. New York: Academic Press, 1973.

Bartlett, F. C. Remembering. New York: The Macmillan Company, 1932.

Basowitz, H., & Korchin, S. J. Age differences in the perception of closure. Journal of Abnormal and Social Psychology, 1957, 54, 93-97.

Birkhill, W. R. & Schaie, K. W. The effect of differential reinforcement and intellectual performance of the elderly. Journal of Gerontology, 1975, 30, 578-583.

Birren, J. E. Translations in gerontology--from lab to life: Psychophysiology and speed of response. American Psychologist, 1974, 29, 808-815.

Birren, J. E. & Woodruff, D. S. Human development over the life-span through education. In P. B. Baltes and K. W. Schaie (Eds.), Life-span developmental psychology: Personality and socialization. New York: Academic Press, 1973.

Botwinick, J. Cautiousness in advanced age. Journal of Gerontology, 1966, 21, 347-353.

Botwinick, J. Age differences in self ratings of confidence. Psychological Reports, 1970, 27, 865-866.

Botwinick, J. Aging and behavior. New York: Springer Publishing Company, 1973.

Botwinick, J., Brinley, J. F. & Robbin, J. S. The interaction effects of perceptual difficulty and stimulus exposure time on age differences in speed and accuracy of response. Gerontologia, 1958, 2, 1-10.

Botwinick, J. & Storandt, M. Memory, related functions and age. Springfield, Illinois: Charles C. Thomas and Sons, 1974.

Bromley, D. B. Some effects of age on short term learning and remembering. Journal of Gerontology, 1958, 13, 398-406.

Buhler, C. & Massarik, F. (Eds.) The course of human life. New York: Springer, 1968.

Charles, D. C. The older learner. The Educational Forum. 1971, 36, 227-233.

Cofer, C. N. On the constructive theory of memory. In F. Weizman and I. C. Uzgiris (Eds.), The structuring of experience. New York: Plenum, 1977.

Corso, J. F. Auditory perception and communication. In J. E. Birren and K. W. Schaie (Eds.), Handbook of the psychology of aging. New York: Van Nostrand Reinhold Company, 1977.

Craik, F. Applications of signal detection theory to studies of aging. Interdisciplinary Topics in Gerontology, 1969, 4, 147-157.

Crowne, D. P. & Liverant, S. Conformity under varying conditions of personal commitment. Journal of Abnormal and Social Psychology, 1963, 66, 547-555.

Cumming, E. & Henry, W. Growing old: The process of disengagement. New York: Basic Books, 1961.

Deese, J. From the isolated verbal unit to connected discourse. In Charles Cofer (Ed.), Verbal learning and verbal behavior. New York: McGraw-Hill, 1961.

Dixon, W. J. & Massey, F. J. Introduction to statistical analysis. New York: McGraw-Hill, 1969.

Dweck, C. S. The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 1975, 31, 647-685.

Edwards, A. & Wine, D. Personality changes with age: Their dependency on concomitant intellectual decline. Journal of Gerontology, 1963, 18, 182-184.

Eisendorfer, C. Verbal learning and response time in the aged. Journal of Genetic Psychology, 1965, 107, 15-22.

Engel, J. B. & Phye, G. D. Learner expectations and the processing of informative feedback by young and elderly adults. Educational Gerontology, 1979, 4,

Erikson, E. Childhood and society. New York: Norton, 1963.

Felker, D. B. & Dapra, R. A. Effects of question type and question placement on problem solving ability from prose material. Journal of Educational Psychology, 1975, 67, 380-384.

Fozard, J. L., Wolf, E., Bell, B., McFarland, R. A. & Podolsky, S. Visual perception and communication. In J. E. Birren and K. W. Schaie (Eds.), Handbook of the psychology of aging. New York: Van Nostrand Reinhold Company, 1977.

Gergen, K. J. & Back, K. W. Communication in the interview and the disengaged respondent. Public Opinion Quarterly, 1966, 30, 385-398.

Gordon, S., & Clark, W. Adult age differences in word and nonsense syllable recognition memory and response criterion. Journal of Gerontology, 1974, 29, 659-665. (a)

Gordon, S. & Clark, W. Application of signal detection theory to prose recall and recognition in elderly and young adults. Journal of Gerontology, 1974, 29, 64-72. (b)

Harkins, S. & Chapman, C. The perception of induced dental pain in young and elderly women. Journal of Gerontology, 1977, 32, 428-435.

Havighurst, R. J. Developmental tasks and education. New York: David McKay, 1972.

Havighurst, R. J., Neugarten, B. L. & Tobin, S. S. Disengagement and patterns of aging. In B. L. Neugarten (Ed.), Middle age and aging. Chicago: University of Chicago Press, 1968.

Holden, J. B. A survey of participation in adult education classes. Adult Leadership, 1958, 6, 258-260; 270.

Howe, M. J. Adult learning: Psychological research and applications. New York: Wiley and Sons, 1977.

Hulika, I. Age changes and age differences in memory functioning. Gerontologist, 1967, 7, 46-54.

Jackson, D. N., Hourany, L. & Vidmar, N. J. A four dimensional interpretation of risk taking. Journal of Personality, 1972, 30, 483-501.

Janis, I. L. Effects of fear arousal on attitude change: Recent developments in theory and experimental research. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 3). New York: Academic Press, 1967.

Jenkins, J. J. Remember that old theory of memory? Well, forget it. American Psychologist, 1974, 29, 785-795.

Kidd, J. R. Adult learning in the 1970's. In Yearbook of Adult and Continuing Education 1977-1978 Third Edition. Chicago, Illinois: Marquis Academic Media, 1978.

Knox, A. B. Adult development and learning. San Francisco: Jossey-Bass, 1977.

Knox, A. B. & Videback, R. Adult education and adult life cycle. Adult Education, 1963, 13, 102-121.

Kogan, N. & Wallach, M. A. Risk taking: A study in cognition and personality. New York: Holt, Rinehart and Winston, 1964.

Korchin, S. J. & Basowitz, H. Age differences in verbal learning. Journal of Abnormal and Social Psychology, 1957, 54, 64-69.

Leech, S., & Witte, K. L. Paired associate learning in elderly adults as related to pacing and incentive conditions. Developmental Psychology, 1971, 5, 180.

Lefcourt, H. Internal versus external control of reinforcement: A review. Psychological Bulletin, 1966, 65, 206-220.

Lefcourt, H. Recent developments in the study of locus of control. In B. A. Maker (Ed.), Progress in experimental personality research. New York: Academic Press, 1972.

Leventhal, H. Findings and theory in the study of fear communications. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 5). New York: Academic Press, 1970.

Maddox, G. L. Fact and artifact: Evidence bearing on disengagement theory from the Duke Geriatrics Project. Human Development, 1965, 8, 117-130.

McConkie, G. W., Rayner, K., & Wilson, S. Experimental manipulation of reading strategies. Journal of Educational Psychology, 1973, 65, 1-8.

McGuire, W. J. Theory of the structure of human thought. In R. P. Abelson, Theories of congitive consistency: A sourcebook. Chicago: Rand McNally, 1968.

Meacham, J. A. A transactional model of remembering. In N. Datan & H. W. Reese (Eds.), Life-span developmental psychology: Dialectical perspectives on experimental research. New York: Academic Press, 1977.

Motoyama, T. Application of psychological scaling procedure to obtain signal detection measures. Unpublished thesis, Iowa State University, Ames, Iowa, 1976.

Okes, I. E. Participation in adult education. 1969 Initial Report. Washington, D. C. : U.S. Government Printing Office, U.S. Department of H.E.W., Office of Education, National Center for Educational Statistics, 1971.

Okun, M. A. Adult age and cautiousness in decision: A review of the literature. Human Development, 1976, 19, 220-233.

Okun, M. A. & DiVesta, F. J. Cautiousness in adulthood as a function of age and instructions. Journal of Gerontology, 1976, 31, 571-576.

Okun, M. S. & Elias, C. Cautiousness in adulthood as a function of age and payoff structure. Journal of Gerontology, 1977, 32, 451-455.

Okun, M. A. & Siegler, I. C. & George, L. K. Cautiousness and verbal learning in adulthood. Journal of Gerontology, 1978, 33, 94-97.

Parker, E. B. & Paisley, W. J. Patterns of adult information seeking. Final report on USOE Project No. 2583. Stanford, California: Stanford University, 1966.

Participation in adult education: Final report 1972. In Yearbook of Adult and Continuing Education 1977-1978 Third Edition. Chicago, Illinois: Marquis Academic Media, 1978.

Phares, E., Ritchie, E., & Davis, W. Internal-external control and reaction to threat. Journal of Personality and Social Psychology, 1968, 10, 402-405.

Pressey, S. L. & Kuhlen, R. G. Psychological development through the life span. New York: Harper and Brothers, L957.

Rindskopf, K. D. Rigidity, anxiety and the older learner. Unpublished doctoral dissertation, Iowa State University, Ames, Iowa 1976.

Rindskopf, K. & Charles, D. C. Instructor age and the older learner. The Gerontologist, 1974, 14, 479-482.

Rotter, J. Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology, 1975, 43, 56-67.

Schaie, K. W. Translations in gerontology--from lab to life: Intellectual functioning. American Psychologist, 1974, 29, 802-807.

Schonfield, D. Translations in gerontology--from lab to life: Utilizing information. American Psychologist, 1974, 29, 796-801.

Seeman, M. Alienation and social learning in a reformatory. American Journal of Sociology, 1963, 69, 270-284.

Seeman, M. & Evans, J. W. Alienation and learning in a hospital setting. American Sociological Review, 1962, 27, 772-783.

Shavelson, R. J., Berliner, D. C., Ravithe, M. M. & Loeding, D. Effects of position and type of questions on learning from prose material: Interactions of treatments with individual differences. Journal of Educational Psychology, 1974, 66, 40-48.

Shaw, R., & Bransford, J. (Eds.), Perceiving, acting and knowing. Hillsdale, J. J.: Erlbaum, 1977.

Silverman, I. Age and the tendency to withold responses. Journal of Gerontology, 1963, 18, 372-375.

Spiro, R. J. & Sherif, C. W. Consistency and relativity in recall with differing ego involvement. British Journal of Social and Clinical Psychology, 1975, 14, 351-361.

Stevens-Long, J. Adult Life: Developmental Processes. California: Mayfield Publishing Company, 1979.

Taub, H. A. Paired associate learning as a function of age, rate and instructions. Journal of Genetic Psychology, 1967, 111, 41-46.

Taub, H. A. Mode of presentation, age and short term memory. Journal of Gerontology, 1975, 30, 56-69.

Taub, H. A. Method of presentation of meaningful prose to young and old adults. Experimental Aging Research, 1976, 2, 469-474.

Taub, H. A. & Kline, G. E. Recall of prose as a function of age and input modality. Journal of Gerontology, 1978, 33, 725-730.

Thorndike, E. L., Bregman, E. O., Tilton, J. W. & Woodyard, E. Adult Learning. New York: Macmillan, 1928.

Tongberg, S. A. Risk taking judgments in adulthood. Unpublished doctoral dissertation, Pennsylvania State University, University Park, Pennsylvania, 1970.

Tough, A. The adult's learning projects: Research in education series No. 1. Toronto: Ontario Institute for Studies in Education, 1971.

Veroff, J., Atkinson, J. W., Feld, S., & Gurin, G. The use of thematic apperception to assess motivation in a nationwide interview study. Psychological Monographs, 1960, 74, 1-32.

Wallach, M. A. & Kogan, N. Aspects of judgment and decision making: Interrelationships and changes with age. Behavioral Science, 1961, 6, 23-26.

Watts, G. H. & Anderson, R. C. Effects of three types of inserted questions on learning from prose. Journal of Educational Psychology, 1971, 62, 387-394.

Welford, A. T. Skill and age: An experimental approach. London: Oxford University Press, 1951.

Welford, A. T. Motor performance. In J. E. Birren and K. W. Schaie (Eds.), Handbook of the psychology of aging. New York: Van Nostrand Reinhold Company, 1977.

Witte, K. L., & Freund, J. S. Paired associate learning in young and old adults as related to stimulus concreteness and presentation method. Journal of Gerontology, 1976, 31, 186-192.

Wolins, L. & Dickinson, T. L. Transformations to improve reliability and/or validity for affective scales. Educational and Psychological Measurement, 1973, 33, 711-713.

Wortman, C., Panciera, L., Shusterman, L., & Hibscher, J. Attributions of causality and reactions to uncontrollable outcomes. Journal of Experimental Social Psychology, 1976, 12, 301-316.

Wyer, R. S. Cognitive organization and change: An information processing approach. Hillsdale, N. J.: Lawrence Erlbaum Associates, 1974.

Wyer, R. S. Attitudes, beliefs and information acquisition. In R. C. Anderson, R. J. Spiro & W. E. Montague, Schooling and the acquisition of knowledge. Hillsdale, N. J.: Lawrence Erlbaum, 1977.